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AMENDMENTS TO THE CLAIMS

This listing of the claims will replace all prior versions, and lists, of claims in this application.

1. (original) A method of detecting particles in liquid samples, comprising the steps of:

bringing a piezo-electric crystal, comprising at least one surface adapted to bind to said particles in said liquid, in contact with said liquid; said crystal being adapted to exhibit resonant mechanical vibrations;

driving said crystal into mechanical vibration with a driving signal at a driving frequency;

connecting said crystal to a first input of a balanced comparator circuit having a low input impedance;

providing a cancellation signal at said driving frequency to a second input of said balanced comparator circuit;

detecting an output signal near said driving frequency at an output of said balanced comparator circuit;

adjusting said cancellation signal so that said output signal is substantially cancelled out;

increasing the amplitudes of said driving signal and said cancellation signal proportional to each other;

detecting transient signals at the output of said balanced circuitry; and

determining that target particles are present in said liquid, based on said transient signals.

2. (original) A method according to claim 1, wherein said driving signal is a sinusoidal signal.

3. (original) A method according to claim 1, wherein said driving frequency is above the fundamental series resonance frequency of said crystal.

4. (original) A method according to claim 3, wherein said driving frequency is within the resonance spectrum of said crystal.

5. (original) A method according to claim 1, wherein said driving frequency is below the fundamental series resonance frequency of said crystal.

6. (original) A method according to claim 5, wherein said driving frequency is within the resonance spectrum of said crystal.

7. (original) A method according to claim 1, wherein said driving frequency is substantially equal to the series resonance frequency of said crystal.

8. (original) A method according to claim 1, wherein said piezo-electric crystal is a surface acoustic wave ("SAW") device.

9. (original) A method according to claim 1, wherein said adjusting step further comprises adjusting an amplitude of said cancellation signal.

10. (original) A method according to claim 1, wherein said adjusting step further comprises adjusting a phase of said cancellation signal.

11. (original) A method according to claim 1, wherein said output signal is sinusoidal.

12. (currently amended) A method according to claim 1, further comprising the step of determining ~~said~~ an optimum driving frequency by recording a conductivity magnitude resonance spectrum of the crystal under actual liquid loading conditions, and then calculating said optimum driving frequency as the frequency at which the first derivative of the conductivity magnitude resonance spectrum exhibits is maximum negative value.

13. (original) A method according to claim 1, whereby said driving signal and said cancellation signal are derived from a common signal source.

14. (original) A method according to claim 1, whereby transient signals are detected at frequencies from 170kHz below said driving frequency to 170kHz above said driving frequency.

15. (original) A method according to claim 1, whereby transient signals are detected at frequencies from 300kHz below said driving frequency to 300kHz above said driving frequency.

16. (original) A method according to claim 1, whereby transient signals are detected at many frequencies over a broadband region.

17. (original) A method according to claim 1, whereby transient signals from said crystal are coupled into an electrical circuit under conditions of optimum impedance matching by using a low input impedance circuit.

18. (original) A method according to claim 1, whereby the at least one surface of said crystal is adapted for binding to said particles in an area that is substantially adjacent to electrodes connected to said crystal.

Claims 19-59 (canceled)